

Claims

1. A semiconductor integrated circuit device comprising:
a plurality of internal circuits arranged internally in a
circuit forming region, said internal circuits having difference
power lines;
an inter-circuit signal wire arranged to interconnect said
internal circuits; and
a plurality of active elements in another connection
configuration including elements of an identical or similar structure
to an active element in a first connection configuration connected
to said inter-circuit signal wire, said active elements being
arranged near said active element in the first connection
configuration to sandwich or surround said active element in the first
connection configuration, said active elements being connected to
power lines of said internal circuits associated therewith and being
isolated from signal wires other than said inter-circuit signal wire.
2. A semiconductor integrated circuit device according to
claim 1, wherein each of said internal circuits includes a
multiplicity of basic cells for active elements regularly arranged
in repetition, and said active element in the first connection
configuration and said active elements in the other connection
configuration are allocated to some of said basic cells.
3. A semiconductor integrated circuit device according to

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claim 1, further comprising a substrate formed in a single chip, and said circuit forming region is allocated to one surface of said substrate.

5 4. A semiconductor integrated circuit device according to claim 3, wherein said circuit forming region includes signal input/output circuits outside said internal circuits, and external connection terminals outside said input/output circuits.

10 5. A semiconductor integrated circuit device comprising:
a plurality of internal circuits arranged internally in a circuit forming region, said internal circuits having difference power lines;
an inter-circuit signal wire arranged to interconnect said internal circuits; and
15 an active element in a second connection configuration
arranged near an active element in a first connection configuration connected to said inter-circuit signal wire, including an element of an identical or similar structure to said active element in the first connection configuration, said active element being connected to power lines of said internal circuits associated therewith and being isolated from said inter-circuit signal wire and other signal wires.

20 6. A semiconductor integrated circuit device according to claim 5, wherein a plurality of said active elements in the second connection configuration are arranged to sandwich or surround said

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active element in the first connection configuration.

7. A semiconductor integrated circuit device according to
claim 5, wherein each of said internal circuits includes a
multiplicity of basic cells for active elements regularly arranged
in repetition, and said active element in the first connection
configuration and said active elements in the second connection
configuration are allocated to some of said basic cells.

10 8. A semiconductor integrated circuit device according to
claim 5, further comprising a substrate formed in a single chip, and
said circuit forming region is allocated to one surface of said
substrate.

15 9. A semiconductor integrated circuit device according to
claim 6, wherein said circuit forming region includes signal
input/output circuits outside said internal circuits, and external
connection terminals outside said input/output circuits.

20 10. A semiconductor integrated circuit device according to
claim 5, further comprising an active element in a third connection
configuration, arranged near said active element in the first
connection configuration and including an element of an identical or
similar structure to said active element in the first connection
configuration, said active element in the third connection
configuration being connected to power lines of an internal circuit

associated therewith and said inter-circuit signal wire and being isolated from other signal lines.

11. A semiconductor integrated circuit device according to
5 claim 10, wherein a plurality of said active elements in the third connection configuration are arranged to sandwich or surround said active element in the first connection configuration.

12. A semiconductor integrated circuit device according to
10 claim 10, wherein each of said internal circuits includes a multiplicity of basic cells for active elements regularly arranged in repetition, and said active element in the first connection configuration, said active elements in the second connection configuration, and said active elements in the third connection configuration are allocated to some of said basic cells.

13. A semiconductor integrated circuit device according to
claim 10, further comprising a substrate formed in a single chip, and said circuit forming region is allocated to one surface of said 20 substrate.

14. A semiconductor integrated circuit device according to
claim 13, wherein said circuit forming region includes signal input/output circuits outside said internal circuits, and external 25 connection terminals outside said input/output circuits.

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15. A semiconductor integrated circuit device according to
claim 10, wherein:

a plurality of said inter-circuit signal wires having
different communication directions from each other are arranged in
5 any pair of said plurality of internal circuits;

said active element in the second connection configuration
and said active element in the third connection configuration are
arranged near said active element in the first connection
configuration on a reception side of said inter-circuit signal wire

10 in one of said pair of internal circuits; and

said active elements in the third connection configuration
are arranged instead of or exclusive of said active element in the
second connection configuration, near said active element in the
first connection configuration on a reception side of said
15 inter-circuit signal wire in the other of said pair of internal
circuits.

16. A semiconductor integrated circuit device according to
claim 15, wherein a group of elements including a plurality of either
20 said active elements in the first connection configuration, said
active elements in the second connection configuration, or said
active elements in the third connection configuration are arranged
to sandwich or surround said active element in the first connection
configuration.

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17. A semiconductor integrated circuit device according to

claim 15, wherein each of said internal circuits includes a multiplicity of basic cells for active elements regularly arranged in repetition, and said active element in the first connection configuration, said active elements in the second connection 5 configuration, and said active elements in the third connection configuration are allocated to some of said basic cells.

18. A semiconductor integrated circuit device according to claim 15, further comprising a substrate formed in a single chip, and 10 said circuit forming region is allocated to one surface of said substrate.

19. A semiconductor integrated circuit device according to claim 18, wherein said circuit forming region includes signal 15 input/output circuits outside said internal circuits, and external connection terminals outside said input/output circuits.

20. A semiconductor integrated circuit device comprising:
a plurality of internal circuits arranged internally in a 20 circuit forming region, said internal circuits having difference power lines;
an inter-circuit signal wire arranged to interconnect said internal circuits; and
an inter-circuit auxiliary wire connected to a static area 25 near a location at which said inter-circuit signal wire is connected.

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21. / A semiconductor integrated circuit device according to
claim 20, wherein each of said internal circuits includes a
multiplicity of basic cells for active elements regularly arranged
in repetition.

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22. / A semiconductor integrated circuit device according to
claim 20, further comprising a substrate formed in a single chip, and
said circuit forming region is allocated to one surface of said
substrate.

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23. / A semiconductor integrated circuit device according to
claim 22, wherein said circuit forming region includes signal
input/output circuits outside said internal circuits, and external
connection terminals outside said input/output circuits.

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24. / A semiconductor integrated circuit device according to
claim 20, wherein said static area includes a partial region of an
active element on a transmission side of said active elements in the
first connection configuration connected to said inter-circuit
signal wire, said partial region being connected to a power line of
said internal circuit associated therewith, and an active element in
another connection configuration having an identical or similar
structure to said active element in the first connection
configuration on a reception side, and arranged near said active
element in the first connection configuration, said active element
in the other connection configuration being isolated from signal

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wires other than said inter-circuit auxiliary wire.

25. A semiconductor integrated circuit device according to
claim 24, wherein a plurality of said active elements in the other
5 connection configuration are arranged to sandwich or surround said
active element in the first connection configuration.
26. A semiconductor integrated circuit device according to
claim 24, wherein each of said internal circuits includes a
10 multiplicity of basic cells for active elements regularly arranged
in repetition, and said active element in the first connection
configuration and said active elements in the other connection
configuration are allocated to some of said basic cells.
- 15 27. A semiconductor integrated circuit device according to
claim 24, further comprising a substrate formed in a single chip, and
said circuit forming region is allocated to one surface of said
substrate.
- 20 28. A semiconductor integrated circuit device according to
claim 27, wherein said circuit forming region includes signal
input/output circuits outside said internal circuits, and external
connection terminals outside said input/output circuits.
- 25 29. A semiconductor integrated circuit device according to
claim 24, wherein said inter-circuit auxiliary wire is connected to

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a neighboring region overlapping with or close to said partial region on said power line connected thereto, instead of said partial region.

30. / A semiconductor integrated circuit device according to
5 claim 24, wherein:

a plurality of said inter-circuit signal wires having different communication directions from each other are arranged in any pair of said plurality of internal circuits;

an active element in a further connection configuration
10 having an identical or similar structure to said active element in the other connection configuration is arranged in addition to said active element in the other connection configuration near an active element in the first connection configuration on a reception side of said inter-circuit signal wire in one of said pair of internal
15 circuits, said active element in the further connection configuration being connected to a power line of said internal circuit and being isolated from said inter-circuit signal wire, other signal wires and said inter-circuit auxiliary wire; and

said active elements in the other connection configuration
20 are arranged instead of or exclusive of said active element in the further connection configuration, near said active element in the first connection configuration on a reception side of said inter-circuit signal wire in the other of said pair of internal circuits.

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31. A semiconductor integrated circuit device according to

claim 30, wherein a group of elements including a plurality of either said active elements in the first connection configuration, said active elements in the other connection configuration, or said active elements in the further connection configuration are arranged to
5 sandwich or surround said active element in the first connection configuration.

32. A semiconductor integrated circuit device according to
claim 30, wherein each of said internal circuits includes a
10 multiplicity of basic cells for active elements regularly arranged in repetition, and said active element in the first connection configuration, said active elements in the other connection configuration, and said active elements in the further connection configuration are allocated to some of said basic cells.

15 33. A semiconductor integrated circuit device according to
claim 30, further comprising a substrate formed in a single chip, and said circuit forming region is allocated to one surface of said substrate.

20 34. A semiconductor integrated circuit device according to
claim 33, wherein said circuit forming region includes signal input/output circuits outside said internal circuits, and external connection terminals outside said input/output circuits.

25 35. A semiconductor integrated circuit device according to

claim 29, wherein:

a plurality of said inter-circuit signal wires having different communication directions from each other are arranged in any pair of said plurality of internal circuits;

- 5 an active element in a further connection configuration having an identical or similar structure to said active element in the other connection configuration is arranged in addition to said active element in the other connection configuration near an active element in the first connection configuration on a reception side of
- 10 said inter-circuit signal wire in one of said pair of internal circuits, said active element in the further connection configuration being connected to a power line of said internal circuit and being isolated from said inter-circuit signal wire, other signal wires and said inter-circuit auxiliary wire; and
- 15 said active elements in the other connection configuration are arranged instead of or exclusive of said active element in the further connection configuration, near said active element in the first connection configuration on a reception side of said inter-circuit signal wire in the other of said pair of internal
- 20 circuits.

36. A semiconductor integrated circuit device according to claim 35, wherein a group of elements including a plurality of either said active elements in the first connection configuration, said active elements in the other connection configuration, or said active elements in the further connection configuration are arranged to

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sandwich or surround said active element in the first connection configuration.

37. A semiconductor integrated circuit device according to
5 claim 35, wherein each of said internal circuits includes a
multiplicity of basic cells for active elements regularly arranged
in repetition, and said active element in the first connection
configuration, said active elements in the other connection
configuration, and said active elements in the further connection
10 configuration are allocated to some of said basic cells.

38. A semiconductor integrated circuit device according to
claim 35, further comprising a substrate formed in a single chip, and
said circuit forming region is allocated to one surface of said
15 substrate.

39. A semiconductor integrated circuit device according to
claim 38, wherein said circuit forming region includes signal
input/output circuits outside said internal circuits, and external
20 connection terminals outside said input/output circuits.

40. A semiconductor integrated circuit device comprising:
a plurality of internal circuits arranged internally in a
circuit forming region, said internal circuits having difference
25 power lines;
a plurality of input/output circuits arranged outside said

internal circuits;

a plurality of external connection terminals outside said input/output circuits;

5 a signal wire passing through an input/output circuit in one of a plurality of sets comprised of any of said internal circuits and any of said input/output circuit, said plurality of sets being connected to common power lines, said signal wire reaching said internal circuit included in the same set as said input/output circuit from any of said external connection terminals;

10 a branched wire branched from said signal wire and passing through said input/output circuit in any other set of said plurality of sets, and reaching said internal circuit in the same set as said input/output circuit;

15 a first protection circuit arranged in said input/output circuit of said one set for said signal wire;

a second protection circuit arranged in said input/output circuit in another set for said branched wire; and

a third protection circuit arranged in said internal circuit in said other set for said branched wire.

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41. / A semiconductor integrated circuit device according to claim 40, wherein each of said internal circuits includes a multiplicity of basic cells for active elements regularly arranged in repetition.

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42. A semiconductor integrated circuit device according to

claim 40, further comprising a substrate formed in a single chip, and said circuit forming region is allocated to one surface of said substrate.

5 43. A semiconductor integrated circuit device according to claim 40, wherein said third protection circuit includes a plurality of protection elements, said protection elements being arranged to sandwich or surround an element to be protected.

10 44. A semiconductor integrated circuit device according to claim 40, wherein either of said first, second or third protection circuit includes an active element connected to a power line of an associated input/output circuit or an associated internal circuit, and isolated from any signal wire.

15 45. A semiconductor integrated circuit device according to claim 44, wherein said third protection circuit includes a plurality of protection elements, said protection elements being arranged to sandwich or surround an element to be protected.

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